



HOW TO...

Get creative with focal length

Camera zoom enables you to get closer to your subject, but that's only part of what it can help you achieve.

Mike Bedford explains how focal length can be used to enhance your photographs

For most digital photographers, a camera's zoom is a way of getting closer to or further from a subject. However, it allows many more creative opportunities besides. As digital single-lens reflex (SLR) cameras with interchangeable lenses become more affordable, making creative use of focal length – the feature that controls the zoom – is becoming an increasingly important skill.

FOCAL POINTS

The amount by which a camera's image is magnified depends on two things: the focal length, which is the distance between the outer lens and the film (in film cameras) or CCD (in digital cameras), and the size of the film or CCD itself. The film in a 35mm camera is, by definition, always the same size, so a particular focal length will have the same effect on all cameras. In digital cameras, the size of the CCD varies so the amount of magnification produced by a given focal length also differs. Because of this, digital camera manufacturers quote a 35mm equivalent focal length. In compact digital cameras, the 35mm equivalent is usually five times the actual focal length. In digital SLRs, ratios of 1.7:1 down to 1.3:1 are more typical, but some cameras have a CCD that is the same size as 35mm film. This means the 35mm equivalent focal length is the same as the actual focal length.

If you're a compact camera user, you can ignore the actual focal length in favour of the 35mm equivalent focal length. However, if you have a digital SLR that can take interchangeable lenses that were designed for 35mm film cameras, you need to know the ratio. For example, if that ratio is 1.3:1 and you're using a 28mm-210mm

zoom lens, it will have a 35mm equivalent focal length of 37mm to 273mm.

A 35mm equivalent focal length of 50mm results in an image that appears neither enlarged nor reduced in the viewfinder. A larger focal length causes the subject to be enlarged. This is referred to as telephoto. Common telephoto settings are between 80mm and 210mm. A focal length less than 50mm is known as wide-angle and causes the subject to be reduced in size. Settings are between 28mm and 35mm; shorter focal lengths tend to be referred to as super wide angle or fish eye.

SIZE MATTERS

Zooming in and out is an easy way to fine-tune your composition. However, changing the focal length doesn't have the same effect as getting closer to or further from your subject. As you move forward, nearby objects appear to grow more than faraway objects. Walk from four metres to two metres from your subject, and it will appear to double in size, but the distant background will barely change at all. By changing your shooting position and adjusting the zoom to compensate, you can control the relative sizes of near and far objects: a wide-angle setting will make nearby objects dominate the picture, exaggerating perspective. Conversely, a telephoto setting tends to flatten perspective, making objects that are spaced apart appear to be close together.

Depth of field also depends on the focal length. If you want a large depth of field, selecting a wide-angle setting is one way of achieving it. Conversely, you can reduce the depth of field by zooming in.

Zooming in to a slightly telephoto setting is also useful for head-and-shoulders portrait shots, as you can stand away from your subject. If you

used a medium setting, you would have to stand about one metre away, which might make your subject uneasy, resulting in an unnatural facial expression.

PRACTICALITIES

The aperture of a lens is described by a measurement called an f-stop, which is the fraction of the lens' focal length. This might sound complicated, but by using f-stops you can get an idea of the lens' ability to receive light, regardless of that lens' specifications. If you choose an f-stop of F4 you set the aperture's diameter to $\frac{1}{4}$ the



Using the tree as a frame for the temple in the background, a wide-angle setting was used, enlarging the tree and achieving a superb depth of field

focal length. On a 50mm lens this is a diameter of 12.5mm and, on a 200mm telephoto lens suitable for an SLR camera, it could be 50mm.

However, on most zoom lenses the aperture's diameter stays the same so, as you zoom in and the focal length increases, the f-stop setting rises. The resulting smaller aperture means you'd need a long exposure to allow enough light in, which adds the risk of camera shake. Zooming in enlarges the image, so the shaking is magnified.

If the camera is handheld there is a risk of shaking if the shutter speed is slower than the reciprocal of the 35mm focal length. You'll get a stable shot with a 250mm lens if you use a speed of $\frac{1}{250}$ second or faster. Otherwise, use a tripod.

Compact digital cameras often have impressive zoom ranges such as 5x but lack wide-angle, typically with a 35mm equivalent of 35mm. You can add a converter that screws into the filter thread, but these aren't available for all models. Wide-angle adaptors usually multiply the focal length by about 0.7; telephoto adaptors by 1.5-1.7.

If you want a greater zoom range with a digital SLR you can buy a lens that replaces your existing one, or get a teleconverter that fits between the camera and your existing lens. It won't be as good as a dedicated lens, but it's a decent option if you occasionally need a super-telephoto lens. **CS**



Here a telephoto setting has been used to bring out the background, giving it equal billing to the foreground of the composition